Software Piracy Determinants Among University Students: An Empirical Analysis

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ABSTRACT

Software piracy is widespread in many parts of the world. Websites such as Kazaa and more recently BitTorrent based websites have made it easier to access pirated software, which has resulted in increased emphasis on the issue of software piracy in both the software industry and research community. Earlier empirical studies have looked at software piracy as an intentional behaviour. This study explores the demographic, ethical and socio-economical factors that can represent software piracy as an unintentional behaviour among a developing country's university students. The authors have conducted a comparative analysis of university students from Pakistan and Canada, two countries that differ economically and culturally. The results of the study indicate that software piracy behaviour is different in both groups of students, but that there are also some similarities.

1. INTRODUCTION

According to Husted (2000), knowledge and information are now more important factors in a national economy than the traditional physical assets that previously indicated economic well-being. Therefore, the protection of intellectual property (IP) has received increased attention recently. Software is also an intellectual property and any unauthorized duplication of computer software is a crime. However, the practice of making illegal copies of software amounts to high rates in various parts of the world. Software piracy directly affects the earnings and profitability of the software industry. Software piracy causes loss of earnings to the firm and loss of tax revenue to the economy of the country (Simmons, 2004; Givon, Mahajan & Muller, 1995). A recent study claims that "For every two dollars' worth of software purchased legitimately [globally], one dollar's worth was obtained illegally" (BSA, 2005, p. 3). The same study claims that eight in every ten software programs installed on PCs in Pakistan are pirated, while the rate in Canada is 35%.

Studies have shown that low national income and low personal incomes are not the only reasons for which software is pirated; Swinyard, Rinne, & Kau (1990) observed that attitudes towards software piracy are affected by cultural standards and customs. Therefore, "the neglect of culture as an explanation of software piracy seems odd given the fact that cultural values have such a significant impact on a wide array of business practices in different countries" (Husted, 2000, p. 200). This study is therefore an attempt to understand those cultural, social and ethical factors that can determine attitudes of software piracy behavior among university students.

The next section presents a brief overview of the current literature along with a description of the research model developed of this study. Section three lists hypotheses of this study. Section four details the adopted research methodology followed by an analysis of the collected data. The results and their implication are discussed in section five, followed by the conclusion.

2. LITERATURE REVIEW & RESEARCH MODEL

Empirical studies have been done on the subject of software piracy in different developing countries such as Saudi Arabia (Al-Jabri & Abdul-Gader, 1997), Thailand (Kini, Ramakrishna & VijayaRama, 2003), People's Republic of China (Wang, Zhang, Zang & Ouyang, 2005) Malaysia (Rahim, Rahman & Seyal, 2000), India (Gopal & Sanders, 1998) and Jordan (El-Sheikh, Rashed & Peace, 2005). Although Husted (2000) and Proserpio et al. (2004) included Pakistan as one of the countries in their respective analytical studies of software piracy, empirical studies on the software piracy issues of Pakistan do not exist in the literature. This seems odd considering the fact that the software piracy rate in Pakistan is one of the highest in the world. A comparative study can therefore provide a means of highlighting differences and possible similarities of software piracy determinants between a developed and developing country. Therefore Canada was chosen for this purpose as it is culturally and economically different from Pakistan and can provide a contrasting view. Moreover, there hasn't been any recent Canadian scholarly literature[1] in this context. This research can therefore help fill a part of that void and the results can provide a better understanding of a developing country's software piracy issues that can help the policy makers to address the problem more effectively.

Theory of reasoned action (TRA) suggested by Fishbein & Ajzen (1975) and theory of planned behavior later developed by Ajzen (1991) have been used

Figure 1. Software piracy behavior model
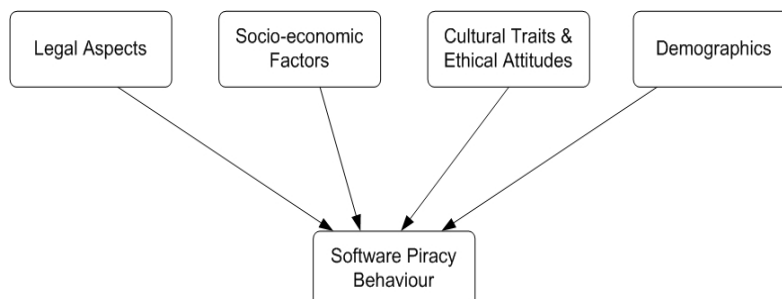
Source: Butt (2006)

extensively in the literature to explain software piracy behavior and intentions. Both of these theories look at behavior as an intentional act. While it is true that the literature on software piracy (a significant portion of which is based on TRA and TPB) has helped in understanding various aspects of the matter, there have been no empirical studies to prove that software piracy can be conceptualized as an unintentional behavior or as a behavior that is the product of the social and cultural environment within which the behavior is carried out.

The model developed for this research[2] (shown in fig. 1) includes social norms as one of the variables. The basic structure of this model has been adopted and modified from a model that was used by Proserpio et al. (2004). Their model was based on a multi-causality approach to determine software piracy factors in 76 countries (including Pakistan and Canada) and is therefore appropriate for this research[3].

The research question for this project is to determine whether software piracy behavior among university students of a developing country can be conceptualized in terms of social and cultural norms and customs, rather than in terms of intentions as has been described (for piracy amongst university students) in most of the literature. We therefore contradict the notion of intentional software piracy behavior and suggest that software piracy can be represented as a consequential behavior that results from social norms of a developing country's society.

3. HYPOTHESES IN THIS STUDY

Earlier studies (Marron & Steel, 2000; Rapp & Richard, 1990) have found a strong inverse correlation between piracy rates and the income level of the country. Therefore, it is hypothesized that:

H1: Income will have a direct influence on piracy behavior of subjects.

H2: High price of original software will have a direct influence on the piracy behavior of subjects.

Many studies (Marron & Steel, 2000; Shin et al., 2004; Husted, 2000; Al-Jabri et al., 1997; Gopal & Sanders, 2000) have concluded that the collectivistic culture or the collectivistic nature of the society is to blame for the high software piracy rates. Moreover, "among high IDV [individualistic] countries, success is measured by personal achievement. Canadians tend to be self-confident and open to discussions on general topics; however they hold their personal privacy off limits to all but the closest friends" (Geert-Hofstede.com, 2006, para. 3). This implies that unlike Pakistan, Canada is based on an individualistic culture and therefore people would refrain from collectivistic activities. Therefore, social norms and culture will be taken into consideration as well and the following is hypothesized.

H3: Social/Cultural norms will have a direct influence on the piracy behavior of subjects.

Several studies (Moores & Dhillon, 2000; Moores & Dhaliwal, 2004; Simpson et al. 1994) concluded that high availability of illegal software and lack of legal implications thereof have an effect on piracy intentions and behavior. The following is therefore hypothesized:

H4: There will be a direct relationship between the availability of pirated software and the intent of subjects.

H5: Legal enforcement will have a direct influence on the intent of the subjects.

H6: Legal enforcement will have a direct influence on the social norms.

Several authors (Kini et al., 2003; Higgins & Makin, 2004; Sims et al., 1996) have found that males were more inclined towards pirating software. Therefore, the following is considered as the null hypothesis for gender.

H7: There will be no difference between males and females regarding their software piracy behavior.

"People's perceptions of a particular behavior are shaped by the existing value system of the society" (Lau, 2003, p. 234). Several studies (Jones, 1991; Swaidan, Rawwas, & Al-Khatib (2004); Siegfried, (2004); and Limayem et al. (1999)) have determined that ethical beliefs of individuals are crucial in their decision-making process. It is therefore hypothesized that:

H8: There will be a direct relationship between attitudes towards piracy and the piracy behavior of subjects.

The discussion that has been presented so far in this research extensively elaborates on the fact that current literature regards piracy behavior as intentional. To conform to the current literature, the following final hypothesis is made.

H9: There will be a direct relationship between intent and actual piracy behavior of subjects.

4. RESEARCH METHODOLOGY
4.1 Site Selection
As is the case with many research projects, this study also had limited resources in terms of time and money. The sites for the study were therefore chosen with these factors taken into consideration. For the Canadian part of the study, the authors' home university was chosen. For the Pakistani study, the city of Lahore was chosen since it has one of the biggest pirated software markets in Pakistan and also has several IT based institutions. Five universities were chosen in Lahore.

4.2 Sampling Characteristics
Students were chosen as the target population in order to conform to the existing research, most of which is based on samples of college and university students. Students at both undergraduate and graduate levels from information technology and computer science departments were included in this study.

4.3 Pilot & Actual Studies
A self-administered survey instrument/questionnaire was developed. This questionnaire consisted of closed-ended questions that were used to collect demographic details about the research participants. The questionnaire also consisted of 31 items, each rated on a 5-point Likert scale to assess respondents' attitude towards ethical, economical and demographic implications of software piracy. Negatively worded items were included to detect response patterns. Various items in the questionnaire were adopted from current literature including Moores & Dhaliwal (2004), Siegfried (2005) and Al-Jabri et al. (1997). Based on the feedback of a pilot study (conducted in Canada), minor changes were made to the format and content of the questionnaire, and it was also modified to make it adaptable in Pakistan.

While conducting the study in Pakistan, hard copies of the questionnaire were physically distributed at the same time in four classrooms and one computer laboratory at each of the five universities. The questionnaire at the university in Canada was administered through the Internet with the use of a secure program written in PHP/CGI to capture responses.

5. DATA ANALYSIS
5.1 Descriptive Statistics
The online survey conducted at the university in Canada returned 208 responses, out of which 196 were usable. Most of the Canadian respondents were under the age of 26 (n=172, 88%)[4]. There were 122 (62%) males and 74 (38%) female respondents. The survey in five Pakistani universities returned 365 responses, out of which 339 (n=339) were usable. As was the case in Canadian data, most of the respondents were under the age of 26 (n = 325, 96%). There were 221 (65%) males and 118 (35%) female respondents.

Table 1. Composite variables in the study

Pakistani Study – Variable (Group) Names	Canadian Study – Variable (Group) Names
Availability	Availability
Legal	Price
Intent	Norms
Norm-attd (i.e. socially or culturally mediated attitudes)	Ethical beliefs and Attitudes
Price	Legal Knowledge
-	Piracy Behavior
-	Intent

5.2 Hypotheses Testing

For testing hypotheses, the questionnaire items in both Pakistani and Canadian questionnaire were grouped together to make the statistical tests feasible. The groupings were made based on 1) the face validity, i.e. interpretability; 2) factor loadings; and 3) reliability aka Cronbach's alpha, sometimes also referred to as 'internal consistency', of the Likert items. This grouping is shown in table 1.

Structural Equation Modeling (SEM) with LISREL was used to test the relationships between the above groups/variables. Based on composite scores, the 'Norm-attd' group in the Pakistani data was further split into 'socnorm' for 'social norms' and 'attit' for 'attitude'. In the SEM for the Pakistani group, a latent variable called 'sociomor' was created which was composed of 'socnorm' and 'attit'.

In the Pakistani data, four of the six 'price' items (i.e. questions from the questionnaire grouped together as 'price' factor) loaded on one factor with internal validity of 0.719 (Cronbach's α = .719). Similarly the reliability of the Canadian 'price' factor was high (α = .69). All four 'availability' items in Pakistani data loaded on a single factor (Cronbach's α = .68). The items were then optimally scaled using multiple correspondence analysis, and Cronbach's α for the four transformed 'availability' items increased to .76. All five Canadian items in this category loaded up with even a higher reliability (Cronbach's α = .813). Principal Component Analysis conducted on the Pakistani 'legal' items resulted in a three factor solution that could be interpreted as being composed of the factors 'legal knowledge', 'legal actions', and 'moral principles'. However, this factor decomposition was not as clear cut as in the Canadian study, so for parsimony a one factor solution was retained. 'Legal' items in the Canadian study loaded up as a 'legal behavior' factor (Cronbach's α =.945) and a 'legal knowledge' factor (Cronbach's α = .482). This implies that the awareness of legal implications of software piracy was more significant among the Canadian respondents.

5.3 Fitting Data on Structural Models

LISREL was used to fit the Pakistani data on a structural equation model.[5] The resulting path coefficients are shown in figure 2. The Canadian data had a poor fit on this model. Therefore another model (shown in figure 3) was made on which Canadian data had a good fit.

The gender →piracy behavior path in the Pakistani model representing a fairly strong relationship with a coefficient of 0.23. hypothesis 7 is therefore rejected in this case. The same path in the Canadian model has a coefficient -0.13 implying acceptance of hypothesis 7. In the Pakistani model, the price factor (price → piracy behavior, 0.03) does not seem to have any effect at all on the piracy behavior, therefore rejecting hypothesis 2. However, it has strong negative relationship (-.047) with the intent variable, thus rejecting hypothesis 1. In the Canadian model, price has very weak relationships with both intent and piracy behavior, having path coefficients of 0.01 and 0.02 respectively. Thus both hypothesis 2 and hypothesis 1 are rejected in this case. Legal issues have a strong influence on both intent (0.54) and the sociomor variable (0.40) in the Pakistani model. Therefore, hypothesis 5 and hypothesis 6 are accepted in this case. The Canadian legal construct has a weak relationship with intent (0.07) and a significant relationship with ethical beliefs and attitudes, thus rejecting hypothesis 5 but accepting hypothesis 6. The availability of pirated software has a very small effect on the intent of Pakistani students (0.13) but has a fairly strong relationship with the sociomor (0.29). Hypothesis 4 is rejected in this case. The correlation between the availability of pirated software and the intent of Canadian students is 0.23. Hypothesis 4 is

therefore accepted for the Canadian data. Intentions in the Pakistani model have a very high negative relationship (-0.76) with the piracy behavior. Hypothesis 9 is therefore rejected. The sociomor construct, on the other hand, has a very significant relationship (0.39) with the piracy behavior, thus accepting hypothesis 3. Since ethical attitudes towards piracy were included in sociomor variable in the Pakistani model, Hypothesis 8 is also accepted. As far as the Canadian model is concerned, the norms variable has a strong influence (0.52). The norms however do not have any effect on the piracy behavior as is evident with a very small path coefficient of 0.05 between the two. Intent on the other hand has a significant relationship (0.34) with the piracy behavior of the students. Hypothesis 9 and 3 are therefore accepted and rejected respectively.
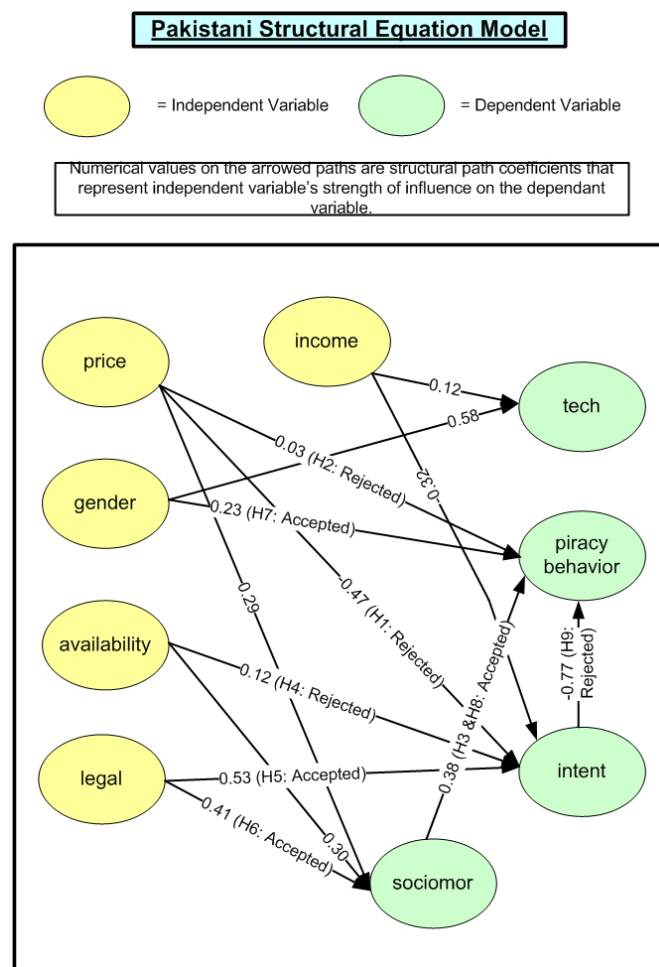
Figure 2. Pakistani structural equation model

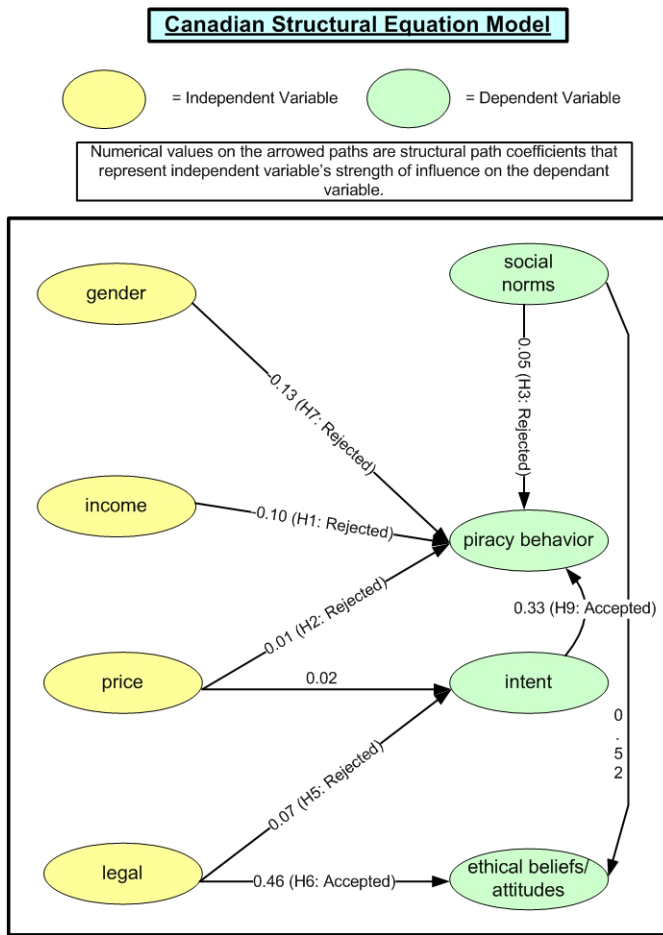

Pakistani Structural Equation Model

○ = Independent Variable   ○ = Dependent Variable

Numerical values on the arrowed paths are structural path coefficients that represent independent variable's strength of influence on the dependant variable.

Figure 3. Canadian structural equation model

Canadian Structural Equation Model

= Independent Variable   = Dependent Variable

Numerical values on the arrowed paths are structural path coefficients that represent independent variable's strength of influence on the dependant variable.

gender

social norms

income

piracy behavior

price

intent

legal

ethical beliefs/ attitudes

0.13 (H7: Rejected)

0.05 (H3: Rejected)

0.10 (H1: Rejected)

0.01 (H2: Rejected)

0.33 (H9: Accepted)

0.02

0.52

0.07 (H5: Rejected)

0.46 (H6: Accepted)

infringement is deeply rooted in the Pakistani society in such a way that one buys and sells pirated software without even realizing that their action might be considered illegal and/or unethical. It is an established norm: a custom; the way an act is supposed to be normally carried by everyone. The abundance of pirated software markets and an almost absent IP related legal enforcement exaggerate an already piracy-favouring environment. Similar conditions are responsible for high piracy rates in other regions of the world as well.

7. CONCLUSION

This study has found that there is no one way of understanding piracy behavior across different countries. Although poor national economy plays a substantial role in software piracy rates, culture is also part of the equation. This study has also suggested that software piracy behavior in a developing country such as Pakistan cannot be conceptualized as an intentional behavior, but it can be in the case of a developed country such as Canada. Caution should be practiced in all future research that attempts to study piracy behavior as the applicability of Western constructs such as 'attitudes' and 'intentions' to collectivist societies must always be critically examined. Based on previous research results and the results of this study, authors of this study are confident that the structural models presented here represent a reasonable explanation of software piracy activity in the student population of Canadian and Pakistani universities included in the study. However, due to limited resources, this research was restricted. Subjects from more countries should be included in future cross-country studies of software piracy behavior so that the results of this study could not only be generalized for the general student population but also to the population at large. There is also a lack of longitudinal research and also of other forms of electronic piracy, such as the availability of pirated e-books on the Internet. Future research could therefore attempt to study both of these domains as well.

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6. DISCUSSION

The analysis of economic factors (high price of legal software and low income) in this study provides a rationale for the reluctance of the Pakistani government to enforce intellectual property rights. Despite being aware of the rampant software piracy, governments of countries such as Pakistan are aware of the economic conditions of the mass population. People (students, in the context of this research) in the developing countries need to have cheap access to resources (software) in order to keep up with the rapid pace of technological advancement in the Western world. It can therefore be assumed that governments of developing countries are aware of this and therefore are always reluctant to enact and enforce strict IP protection laws.

The empirical evaluation provides strong support that social norms and positive attitudes are correlated with the actual piracy behavior of Pakistani students. This finding is similar to that of Proserpio et al., (2004), Seale et al., (1998), Limayem et al. (1998) and Al-Jabri, I. & Abdul-Gader (1997). On the other hand, intentions proved to be stronger predictors of piracy behavior of Canadian students and this finding conforms to the literature which regards piracy behavior as intentional. The achieved results answer the research question that this study was based upon; that is, it supports the hypothesis that software piracy behavior in Pakistan cannot be regarded as purely intentional. It should rather be conceptualized as a consequential behavior resulting from various elements, with customs or social norms being the strongest of them all.

Swinyard et al. (1990) noted that "the cultural history of Asia does not generally support the notion of protecting proprietary creative work. In many Asian nations the highest compliment one can be paid is to be copied" (p. 657). Due to a lack of IP related awareness (unlike the Western world), this culture of copyright

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ENDNOTES

[1] There was only one Canadian empirical (scholarly) study found in the literature (see Limayem et al., 1999). This study however relied on 98 research participants only and therefore cannot be considered very extensive.

[2] It is important to emphasize here that the model shown in Figure 1 presents a very basic structure which represents the theoretical base of this research.

[3] This model is an adaptation from one of the author's earlier work (Butt, 2006).

[4] All percentages are rounded off.

[5] Regression analysis of the data was also conducted using SPSS but due to word limitations is not presented here. Complete data analysis is given in the main author's graduate thesis available through his website: www.sfu.ca/~abutta

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